National & Household Food Security: Effects of Zambian Economic Reform

by

Robert C. Johansson[1]

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Abstract: *This paper evaluates the effects of economic reform on national and household food security in Zambia. More specifically, it examines the effects of increased Zambian interaction with global markets on food security. This paper will analyze agricultural sector price and production trends as well as domestic purchasing power over time. Data for this analysis will consist of GRZ reported statistics, secondary NGO data compilations, and interviews with private and public sector policy makers. It is shown that the Zambian economy had recovered significantly since the introduction of economic reforms, but that this recovery is jeopardized by 1998 GRZ policies. These new policies contradict commitments to structural adjustment and risk prolonging the painful transition to a free-market economy.*

[1] Robert C. Johansson is currently a graduate student in the Department of Applied Economics at the University of Minnesota and was a Summer Intern with USAID in Zambia in 1998. Contact address: Dept. Applied Economics / University of Minnesota, #316c / St. Paul, Minnesota 55108.

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ABBREVIATIONS AND ACRONYMS

ACE	Agricultural Commodity Exchange
ASIP	Agricultural Sector Improvement Program
ATAC	Agri-business Technical Assistance Center
BOZ	Bank of Zambia
CDC	Commonwealth Development Corporation
CLUSA	Co-operative League of the United States of America
COMESA	Common Market for Eastern and Southern Africa
CSO	Central Statistics Office
EBZ	Export Board of Zambia
EWU	Early Warning Unit
FAO	Food and Agriculture Organization, of the United Nations
FAS	Foreign Agriculture Service, USDA
FEWS	Famine Early Warning System
FRA	Food Reserve Agency
GRZ	Government of the Republic of Zambia
ISI	Import-Substitution Industrialization
JCTR	Jesuit Centre for Theological Reflection
LDC	Lesser Developed Country
MAFF	Ministry of Agriculture, Food and Fisheries
MOF	Ministry of Finance
MT	Metric Tonne
NAMBOARD	National Agricultural Marketing Board
NEWS	National Early Warning System
NGO	Non-Governmental Organization
PAM	Program Against Malnutrition
RSA	Republic of South Africa
SADC	Southern African Development Community
SAP	Structural Adjustment Program
USAID	United States Agency for International Development
VAM	Vulnerability Assessment Mapping
ZCCM	Zambian Consolidated Copper Mines
ZNFU	Zambian National Farmers Union
ZPA	Zambian Privatization Agency

I. INTRODUCTION

Emerging after a decade of structural adjustment programs in Africa are two development philosophies. One philosophy, call it *structural dualism*, promotes the belief that structural adjustment has been beneficial to the commercial sector, but ignores the majority of rural families who are left to struggle in a poverty trap. This consensus views the return of government market controls to provide a safety net for the disadvantaged as a necessary feature of African transitions to a free-market economy. The other philosophy, call it *continued reform*, reflects the feeling that the steps taken by many African governments towards structural adjustment have been too small and too slow. The continued-reformers believe that for sustainable economic growth and consequential increases in living standards for all members of society, it is necessary for governments to encourage the development of a competitive private sector. Currently in Zambia it would appear that GRZ and the donor community subscribes to different philosophies and that NGO's fall somewhere in between. The analysis in this paper supports a continued reform position.

This paper proposes to evaluate the effects of Zambian integration into global markets on household and national food security. A common definition of food security is the ability of countries or its households to meet targeted consumption levels at all times so as to lead healthy, productive and active lives. The core analysis then for this paper is to assess the level to which open market policies have helped or hindered Zambian households and its government to sustainably meet these targeted consumption levels.

This analysis is complicated by the transitory nature of the Zambian economy during this period. The economy of Zambia is in a decade long transition between one-party democracy[2] and a multi-party democracy. It is also in a transition between a control economy and a free market economy. How should the effects of the structural adjustment program (SAP) be judged: in absolute terms, as compared to where Zambia would be under its previous control economy, as compared to its neighboring contemporaries, or as compared to the world as a whole? In addition, the definition of "meet", "targeted consumption", "at all times", and "healthy, productive and active" also guides how one judges these effects.

In an attempt to untangle the many events affecting food security, the following assumptions will be made. It is assumed that the import-substitution industrialization (ISI) policies pursued under the control economy prior to SAP were unsustainable and therefore, any movement towards sustainable economic growth is a positive movement towards enhancing food security. Similarly, it is assumed that one-party democracy was politically unsustainable and any movement away from this political system

2 Kenneth Kuanda was the president of Zambia from 1964 - 1991. Fredrick Chiluba was elected in democratic elections in 1991. He was reelected in 1996 for five more years.

towards representative governance will eventually enhance food security. The sustainability of food security will be addressed in the short-term trends that are available from existing, reliable data sources.

Background of SAPs

Following independence in 1964, Zambia's economic performance remained robust until 1974 posting average annual growth rates of 5% to 6%. However, in 1975 the price of copper dropped 40%. At the same time fuel costs rose substantially, slowing growth in Zambia's landlocked economy. These circumstances combined to significantly diminish government revenue and to augment balance of payments and budget deficits. Between 1974 and 1978, Zambia adopted import-substitution industrialization (ISI) policies to reduce import demand and to develop additional sources of foreign exchange. To do this, the government increased foreign borrowing and cut public goods investments. During this period Zambia was unable to diversify its export earning capacity. In 1982 copper still provided 90% of Zambia's foreign exchange. Real GDP growth between 1975-1985 averaged -2.5% per year. At the same time population growth averaged 3.3%. By 1984 Zambia was the most indebted country in the world relative to its GDP (Saasa 1996).

During this period (1975-1985) real agricultural value added to GDP grew at an average rate of 2.5% and its share of GDP increased from 11% to 14.5%. The agricultural share of total exports declined (partially due to drought conditions) to less than 1% after 1978 (Jansen 1988). The main reasons for the sluggishness of the agricultural sector were: excessive government regulation, intervention in markets, and weak infrastructure and support services. In its attempt to keep urban food prices low, the government kept farmgate prices well below import parity and free market prices.

It was with this background that Zambia embarked on a road to economic reform. The GRZ has pursued structural adjustment policies since 1983[3]. Sporadically since 1983 and continuously since 1992 free exchange of the Zambian Kwacha has been allowed on the world currency markets; since 1991 the GRZ has made a concerted effort to divest itself of inefficient parastatals; and since 1995 the GRZ has publicly stated its intention to remove itself from the agricultural sector. As a result the private sector has become more integrated into the agricultural sector, especially in the maize marketing and input supply sectors[4].

In theory, trade reform and structural adjustment programs (SAPs) are intended to remove restrictive government intervention and to let market forces direct economic growth. Typical scenarios following SAPs are high depreciation and domestic industry contraction, followed by export led growth.

3 See Appendix: Structural Adjustment Policy Time Line.

4 Recently (June - August 1998), the GRZ has vacillated on this commitment to fully liberalize, most notably with respect to the fertilizer sector.

This export-led growth often takes place first in the agricultural sector. The agricultural sector in Zambia, formerly retarded by ISI policies, should be allowed to expand to fit the market economy and to enjoy its comparative advantage in abundant arable land[5] and inexpensive labor. In addition, with GRZ investment into human capital and infrastructure, Zambian agriculture could enjoy significant factor productivity gains. These gains will be necessary to offset the negative capital shocks now occurring in Zambia[6].

Example 1: Dairy Industry Investment

There has been substantial investment in the domestic Zambian dairy industry since privatization of the parastatal dairy board in 1994. Bonnita and Finta Farms have both invested heavily in Zambian milk processing and "outgrower schemes". Bonnita reports 20% per annum growth at its purchased dairy parastatal processing plants in Lusaka, Mazabuka, and Kitwe since 1994. Finta Farms produces approximately 20,000 litres of fresh milk per day. It has invested an additional $2.7 million in its Livingstone processing plant to double its reported 45,000 litre/day capacity. According to Mr. Ron Parbhoo, Finta Managing Director, this will meet rapidly increasing domestic demand as well as to increase its exports of long-life milk to neighboring SADC countries (*The Times*, page 10, July 30, 1998). These investments and increase in competition in the Zambian dairy industry illustrate the beneficial effects of market liberalization. Under the former ISI regime Zambia was spending scarce foreign exchange reserves to subsidize these industries. Under a free-market environment, consumers gain from lowered dairy prices and increased choices due to increased competition in the dairy industry as well as from international imports of milk products.

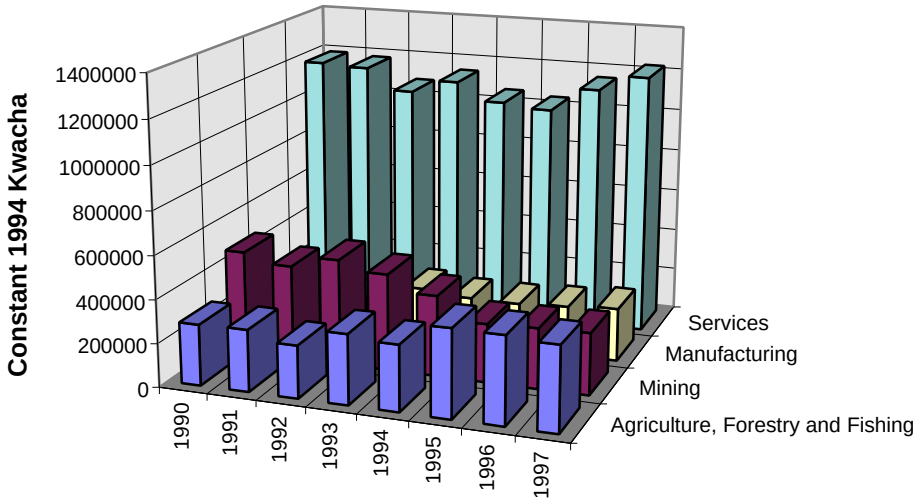
Examining the economic financial summaries it seems as though the SAPs are indeed producing the desired effects. Between 1990-1997, the primary agricultural sector alone has expanded by 37% (not including agribusiness enterprises) despite suffering two droughts. During the same period, mining sector earnings declined by 40.5 % due to falling world copper prices and inefficient management (MOF 1998). If we examine Zambian GDP by kind of economic activity it can be seen that between 1990 and 1997 the composition of GDP changed (see Figure 1). Most dramatic is the increase in the contribution of the agricultural sector to GDP (from 13% to 18%) and the decline of the mining sector (from 22% to 12%).

5 Zambia contains HA of unused agricultural potential. 15% of arable land is currently in use. Of that land ZNFU estimates without government intervention in input supply markets that Zambia could easily produce 14 million bags of corn (approximately 1.25 million MT or roughly the production realized in 1995/96 when Zambia exported an estimated 85,000 MT of maize).

6 These capital shocks include both human capital and physical capital (AIDS and high interest rates).

Gains in the agricultural sector are helping to cushion the impact of falling copper prices. The SAPs focus on productivity gains in the agricultural sector as appropriate to provide the engine for Zambian economic growth in the future[7].

Figure 1: GDP by Economic Activity



Source: MOF (1998).

Whether these changes are leading to increases in household food security remains to be seen. It can be assumed that the situation today is an improvement compared to what would have been if Zambia had continued the unsustainable economic practices of the 1970's and 1980's. The privatization programs have been slow to start and sporadically followed, with the main parastatal (ZCCM) still generating GRZ revenue losses. In assessing the effect on food security there are several indicators that will be useful for analysis. These include: price trends, production trends (taking into account product diversification), and consumer purchasing power.

II. FOOD SECURITY

Food security should not be confused with poverty, even though the two terms are socio-economic indicators. Poverty diminishes food security. Siamwalla and Valdes (1980) define food security as, "...the ability of food-deficit countries, or regions or households within these countries, to meet target levels of

[7] Services include: utilities, wholesale and retail trade, transportation, storage, real estate, etc.

consumption on a yearly basis..." The poverty line can be used as a target level of consumption. However, an evaluation of national or household food security must examine fluctuations in food supply, fluctuations in prices, and fluctuations in consumers' buying power over time.

There are obvious linkages between these three factors: food shortages cause prices to rise, decreases in consumer buying power reduces effective demand and causes prices to fall, increases in farmgate prices lead to positive supply responses, etc. It should be noted that fluctuations in non-food production and/or prices also affect household's ability to achieve food security. A recent example of this is the affect of falling world cotton prices due to the Southeast Asian financial crises. Cotton farmers may receive lower prices for their product, hence affecting their ability to afford food products. The essential question to be answered in the analysis is whether Zambian liberalization efforts have increased Zambian household and governmental ability to achieve target levels of consumption on a yearly basis (i.e., sustainability) as compared to a scenario with no SAPs.

In a recent evaluation of food security in Eastern and Southern Africa the importance of evaluating consumers' purchasing power is noted:

> "In all the countries visited, the mission's observations are that food insecurity is principally caused by the lack of access to enough food. This lack of access is a function of inadequate income and not a food availability problem. In Ethiopia, RSA, Malawi, Tanzania, Kenya, Zambia, Zimbabwe, and to a lesser extent Mozambique, there are tendencies by government planners, donors and the NGO's to focus on the supply (**availability**) factor without due consideration for the demand (**access**) factors. This lack of distinction in figuring out whether the problem of food insecurity is one of supply or one of low purchasing power is at the root cause of food security and poverty. The policy focus in the SADC and IGAD states visited must shift from an exclusive emphasis on ensuring national food self-sufficiency (**availability**) to the goal of household food security strategies that promote the increased and more stable income levels of the poor and vulnerable groups. In all the countries visited, most food shortages are of a transitory nature and may result from instability in food production (due to inconsistent government policies), increases in food prices (due to the inefficiency or a collapse of the marketing system), inequalities in the distribution of income and wealth (due to past policies), seasonality of rainfall and fluctuations in the inter-annual variation of production. Failure by the policy makers to address these issues accentuates the problem of food insecurity and may result in situations of chronic food insecurity, i.e., the continuous inability of households to either buy enough food or to produce their own food." (Quote from "Technical Working Paper on Food Aid, Food Security, and Social Safety Nets" prepared by FAO/Netherlands and SADC April, 1998.)

This quotation points out many of the causes of Zambian food insecurity: poor environmental conditions (such as droughts and corridor disease) and poor economic conditions caused by inconsistent government policies (such as high rates of Kwacha depreciation and inflation). As food security is measured over time an intertemporal general equilibrium analysis would be preferable to assess long-run sustainability. For example, a country's population growth, when compared to agricultural and economic growth, is a factor contributing to food security. It is obvious that if a country's population is growing more quickly than is its productive capacity food security will erode. An intertemporal general equilibrium analysis would allow modeling of these effects. However, as sufficient data is not yet available for this analysis, short-run effects of liberalization on food security will be assessed using partial equilibrium analysis.

GRZ/FRA Policies Affecting Food Security

The Zambian government has not wholly refrained from maize market and fertilizer market interventions. It should be noted that the new government in 1991 enacted dramatic reforms in the agricultural sector, but had to backpedal the following year due to a severe drought in the Southern Africa region. Maize production fell from 12.2 million bags (90 kg) in 1991 to 5.1 million bags in 1993. The speed of the liberalization process has caused transitional difficulties among the small-scale farm community. The private sector has been restricted in responding to liberalization of agricultural markets due to high interest rates and lack of effective storage capacity (Saasa 1996). The detrimental effect on food security can simply be restated and examined using simple statistics.

As indicated (Example 2) the private sector is capable of importing large quantities of maize. In fact as early as 1988 private traders and millers have been importing significant quantities of maize. In 1998 private sector millers, suffering from scarce foreign exchange availability and fearing dumping of cheap GRZ imports[8] (the government tendered a request for 410,000 MT of maize in August 1998), has not entered the potentially lucrative maize storage and arbitrage market, preferring to pay only for operating maize supplies. Should the GRZ be unable to import its stated goal of maize due to its own foreign exchange limitations there may be a greater maize shortage than there would have been had the private sector been allowed to freely import and market maize and competitive prices.

[8] Last year Chani Fisheries imported cheap mealie meal from RSA via reported GRZ connections and undercut domestic maize millers. The resulting loss in the 1996/97 season is still affecting these millers financial stability today (Wentling 1998.2). Recently reported (*Zambia Daily Mail*: 9/3/98, page 4) Chani Enterprise of Kitwe has imported breakfast meal from RSA and would sell the 25 kg bags for K12,500 compared to other retailers at K17,500. It is reported that Chani has links to the GRZ and also that it does not pay import taxes as must other international traders. If true, a proxy value of K5000 per 25 kg bag of breakfast meal could be used to determine the economic drag of import taxes. This landed price for RSA mealie meal is below public market prices in RSA, which indicates that this meal is being subsidized somewhere in the marketing chain.

Example 2: Zambian Maize Quantities

MAIZE	**1994/95**	**1995/96**	**1996/97**	**1997/98**
Production (MT)	738,559	1,410,811	954,955	646,950
Marketing Year	1996	1997	1998	1999
Surplus	0	85,000	0	0
Deficit	400,000	0	270,000	683,909
Imports	250,000	0	145,000	583,909*
Exports	50,000	85,000	100,000	?
Food Aid	10,000	88,000	0	45,000*
Commercial Imports	215,000	381,000	0	?

* Denotes projected quantities.

Source: Wentling (1998 a & b).

The GRZ also has not refrained from interfering in the agricultural input supply markets (Example 3). Its' uncertain fertilizer policy has caused market inconsistencies that have affected both farmers and private sector suppliers. This vicious circle of GRZ interference and inconsistent policy from year to year in maize marketing and input supply is stated as the greatest limitation to private sector investment in Zambia and to the farming sectors decision making environment[9].

Example 3: Fertilizer Imports (MT)

Fertilizer	**1992/93**	**1993/94**	**1994/95**	**1995/96**	**1996/97**	**1997/98**
GRZ	50,000	8,000	0	33,000	48,500	0
Private Sector	5000	15,400	8,900	46,000	53,000	60,000
Donor Aid	49,000	113,840	66,000	26,000	40,500	23,000

Source: Mwale and Mawele (April 1998).

When the GRZ brought in fertilizer credit in 1996, Omnia fertilizer had operations in the Makushi marketing area. Following the GRZ fertilizer loans (which are subject to low rates of recovery), Omnia was obligated to remove their outgrower and extension services to that region due to lost demand.

[9] Quote by ZNFU president, Mr. Vashee (Omnia Interview: August 1998).

Ironically, the GRZ states that it is the inability or unwillingness of the private sector to service remote areas as the reason that it *MUST* provide these farmers with fertilizer and marketing services. For the 1998/99 growing season the GRZ will be managing the dispersal of approximately 80,000 MT of fertilizer, which is approximately equal to the entire annual use of fertilizer for maize production in Zambia. In addition to its 410,000 MT tender for maize, the amount of foreign exchange necessary to distribute 80,000 MT of fertilizer is a substantial expenditure ($101 million compared to $110 million in total GRZ reserves) and divergence from stated GRZ commitments to SAPs. The likelihood that these quantities of fertilizer and maize will enter public and private markets in Zambia is questionable, but the effect on private sector investment confidence will be negative (Johansson, 1998).

The scarce foreign exchange used by the GRZ to import maize and fertilizer could be more effectively used to stabilize the Kwacha or to investment in infrastructure. This is illustrated by the projected 1997/98 food shortage. The National Early Warning Systems (NEWS) using FAO/WFP assessment techniques reports that there is a 643,000 MT cereals shortfall (NEWS 1998). Using the same MAFF crop forecast accounting for the contribution of roots and tubers[10], it is reported that there is a 331,745 MT food surplus in Zambia (Wood, et al, 1998). However, roots and tubers are not being marketed for the most part (5% of cassava production and 13% of sweet potato production). The surplus in these crops is primarily found in the Luapula and Northern Provinces. The complimentary shortages are reported in the Copperbelt, Central, and Southern Provinces. The problem then is one of distribution and not of production. Infrastructure problems have been listed as the limitation on food security in the past, and it is still true today. Under pan-territorial and pan-seasonal pricing it was not profitable with the current transportation system to supply these areas or market their products. As prices adjust to the market system, it can be assumed that increasing prices for maize will make inexpensive tubers and cassava flour from these areas more attractive to marketers. It should come as no surprise that sweet potatoes from Kasama in Northern Province are now being sold in Choma in Southern Province.

In a recent FAO/World Bank soil fertility study (July 1998), the transition to a liberalized economy and associated increases in prices for inputs in remote areas was one of the driving forces behind the adoption of new soil fertility management techniques. This is vital to maintaining and increasing growth in Zambian agricultural productivity. Infertile soils that are unresponsive to inorganic fertilizers will continue to diminish yields as has been seen in Zimbabwe and Malawi if Zambian smallholders do not adopt sustainable soil management technologies (Johansson 1998).

III. AGRICULTURAL PRICE TRENDS

As Zambian agriculture and agribusinesses become more integrated into the global economy they will be exposed to more price volatility. The institutional framework to reduce exposure to these variations is not in place (e.g., effective futures and options markets). In addition, reliable credit and savings institutions are not available in many rural areas. The provision of these institutions by the private sector is one of the main areas remaining to be developed, which will enhance household food security.

Example 4: Castor Oil Markets

For the 1996/97 growing season PAM was involved in distributing fertilizer credit to small-scale farmers. As part of their requirement for farmers to enroll in their program at least 50% of the farmer's land was to be planted in a cash crop. PAM encouraged farmers to grow castor and suggested that the farmgate price would be K500/kg. By harvest time the world castor market was depressed and farmers only realized K350/kg. This did not cover costs and discouraged many farmers from participating in this type of credit/outgrower scheme. However, in *Export Review* (1998), "Castor Oil Prices Soaring" reports that world prices are up to their highest point in seven years due to a shortfall in Brazilian supply (EBZ 1998).

With agricultural sector liberalization and agro-processing parastatal privatization, it is expected that maize marketing efficiency will improve. Important developments include private trader and multinational marketing and distribution. Multinational traders provide the foreign exchange to purchase large sums of maize and to store it, selling to domestic millers when contracts expire or prices rise to profitable levels. In addition they provide the means for GRZ tenders of large amounts of maize imports from surrounding countries. The increases in efficiency from such arrangements with the GRZ are hard to notice. In fact GRZ tenders are quite inefficient, but they rely on the international trading community to function at all. One monitoring agency reported that the reason for GRZ tenders this year was to provide enough margin to pay the FRA payroll.

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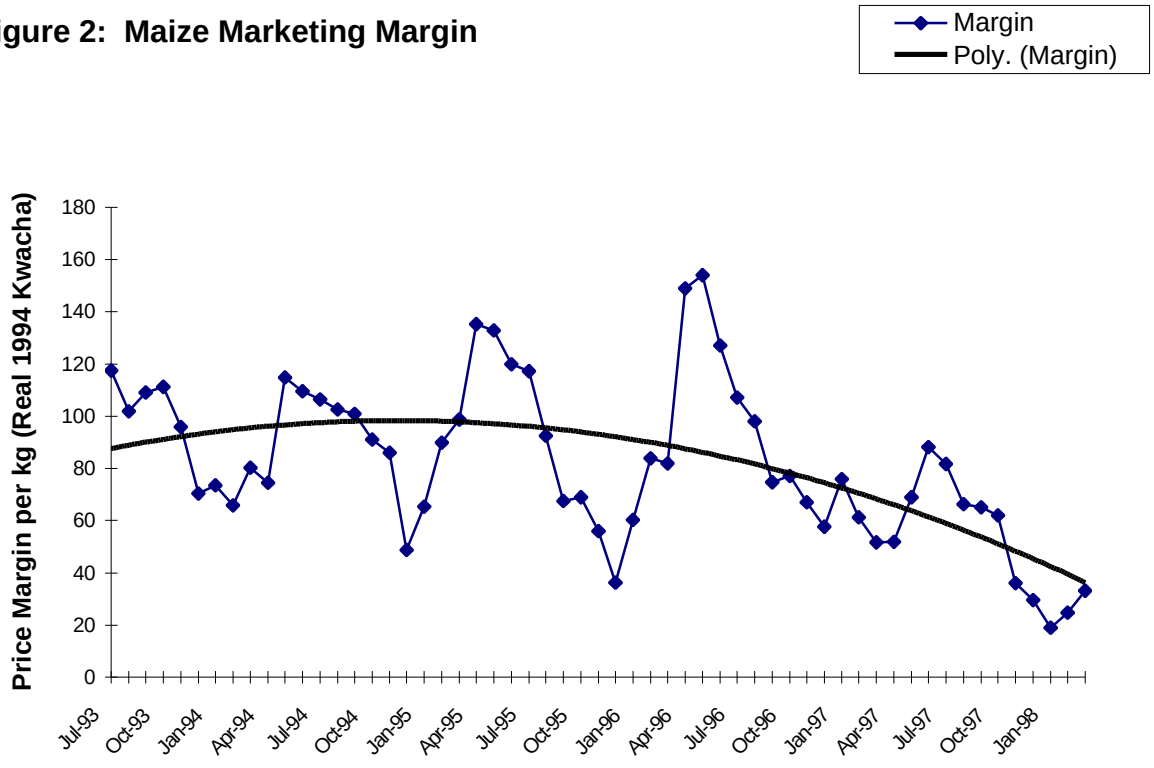
[10] In Zambia the primary roots and tubers are cassava and sweet potatoes. They are estimated to contribute roughly 60% of the total food production in Zambia for 1997/98.

Example 5: Private Sector Milling

Zambian millers unable to access foreign exchange to import sufficient maize to continue operating are forced to rely on international traders. International traders buy large quantities of domestic maize early in the harvest season using foreign exchange from off shore accounts and hold it for arbitrage purposes. In 1998, these traders realized a gross revenue of approximately $30 / MT. A purchase of 5000 MT of domestic maize (with a purchase price of $170 / MT and selling price of $200 / MT) will yielded gross revenues of approximately $150,000 excluding overhead.

With market liberalization, miller marketing and distribution margins have been reduced by competition. The competition from hammermillers is also cutting into miller profits, previously estimated to be between 15% and 20% (Wentling 1998.b). Part of this decreased miller margin is now claimed by multinational traders, compensating them for price and foreign exchange risks. This redistribution of margins has led to some industrial mill closures. This efficiency should in theory translate into smaller marketing margins between the retail price of maize meal and the into-mill price (Figure 2).

Figure 2: Maize Marketing Margin



Source: FEWS (1998).

The decrease in the maize marketing margin is due to increased competition in the milling and informal maize marketing sector. Mill-to-retail margin accounts for approximately 50% of the retail value of mealie meal (Jayne, et al, 1996). It can be seen that this margin in Zambia has been declining significantly since policy reforms (see Figure 2). The decrease in maize milling margins is illustrated here using a 2nd degree polynomial trend line. In absolute terms the margin has decreased by 60% (from 100 Kw/kg in 1993 to 40 Kw/kg in 1998). One factor contributing to the increased competition in maize marketing is the widespread availability of hammermills. These mills process maize, sorghum, millet, and cassava on a custom, low cost basis. This development of small-scale milling capacity helps to decrease meal prices for the urban poor and increases the marketing access for small-scale traders.

Example 6: Hammermilling

Hammermilling in Zambia supplies an estimated 55% of consumer demand for mealie meal (an estimated 2000 hammermills have been sold in the last 15 years of which 10% are located in Lusaka). Meal from hammermills is more nutritious than industrially processed maize meal, and it is less expensive.

Output from 90 kg Maize	**Breakfast Meal**[11]	**Cost/kg**
Industrial	50 kg	K720
Hammermill	62.5 kg	K353

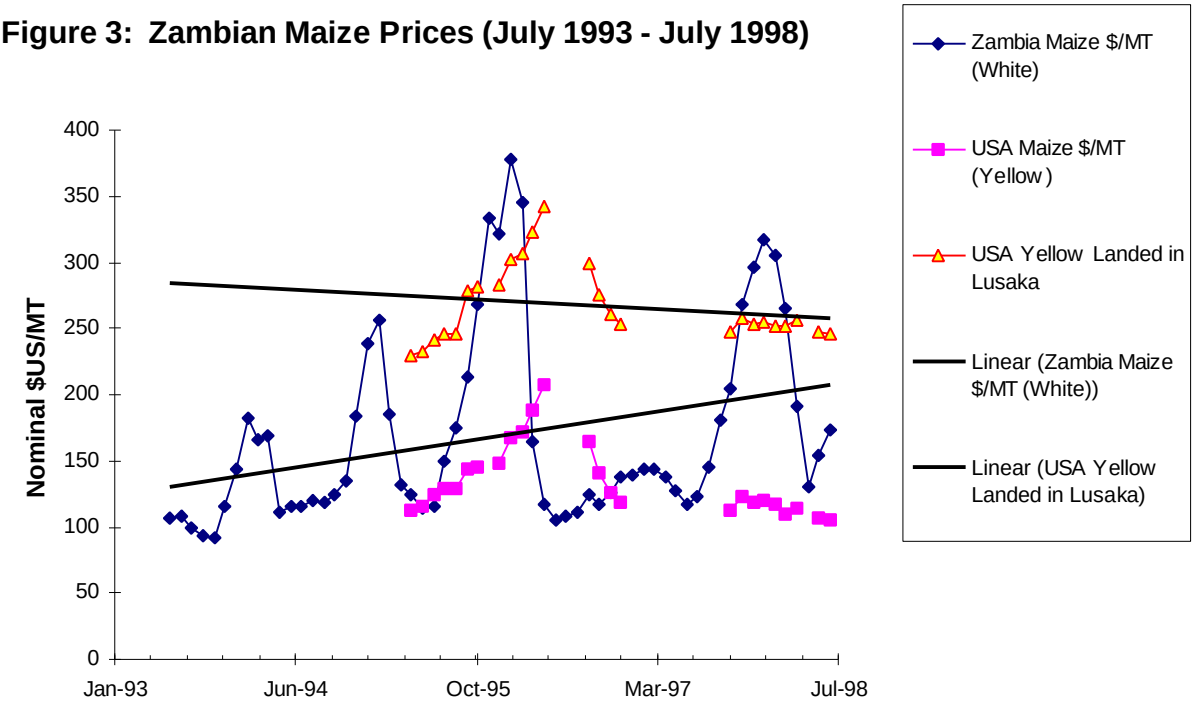
Therefore, hammermilled meal is approximately 50% (if the value of the by-product is taken into account the margin approaches 75%) cheaper than industrial meal. Peak hammermilling is between April and August. Hammermills suffer from low access to imported maize and face operating slowdowns from September through January. This is the industrial millers boom season. Hammermills are a durable investment with a long life. Only 6% of mills are reported to be broken down. Spares are fairly easy to come by in local markets. Currently there is a slump in hammermill sales in Lusaka, which generally report sales of between 12 to 15 hammermills per month. This slump is due to lack of credit and saturation of local market.

If we compare the price of wholesale maize in Lusaka public markets to the price of U.S. maize imported via Mozambique we can see that the Zambian prices fluctuate to a much greater extent than does the U.S. maize. It should be noted, however that the Zambian maize is white maize and the U.S. maize is yellow no.2. From this comparison it would appear by using crude trend lines that the farmgate price for

[11] Hammermillers report that 80% of their sales are breakfast meal.

maize is approaching the import parity price since liberalization (Figure 3). As import parity price is higher than previous state controlled prices, this indicates that maize farmers are receiving higher prices. The unsustainable GRZ practice of subsidizing urban mealie meal consumption has been curtailed to a large extent. The urban market prices will therefore increase over time as is indicated below. However, these price increases will not be entirely born by the consumer as the marketing margins shrink with increased efficiency and competition as can be seen in Figure 2. Both of these trends are to be expected from successful implementation of SAP's. They reflect the transition from a control economy to a market economy. The implications for food security are that short run transitional changes will adversely affect urban consumers, but that the majority of rural Zambian farm communities will benefit.

Figure 3: Zambian Maize Prices (July 1993 - July 1998)



Source: AMIC/MAFF (1993-1998).

The GRZ through the FRA has not entirely refrained from subsidizing the urban population. Between November 1997 and December 1998, the FRA sold approximately 33% of the total demand for urban Lusaka to private companies at below market prices. This subsidy to millers averaged K8,220 per 90 kg bag, which equals US$936,943 over a 3 month period. The situation in Eastern Province markets even more pronounced: the FRA sold 140% of market demand at a margin of K9,510 per 90 kg below

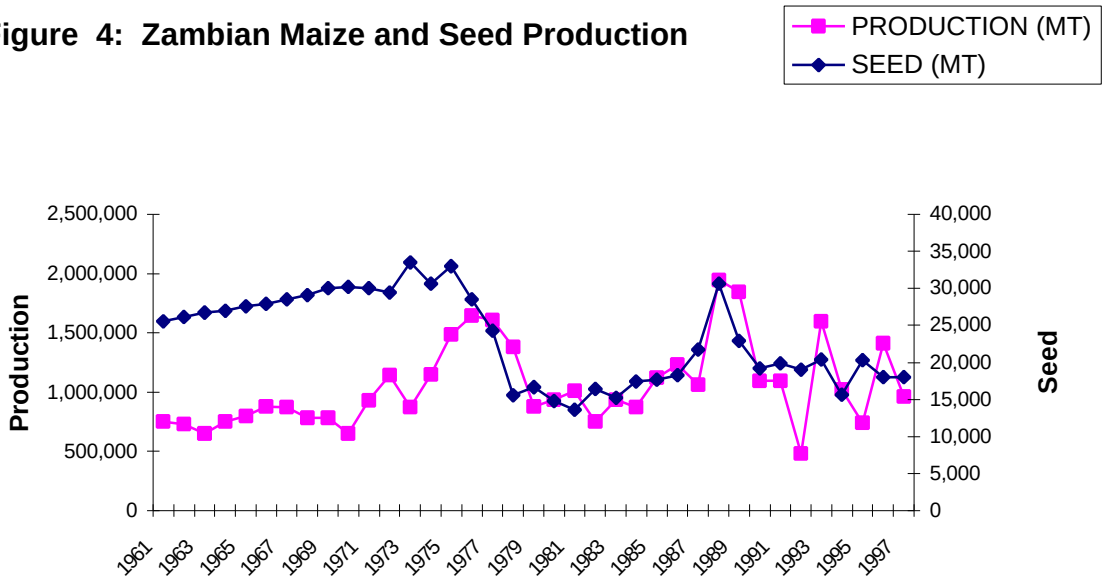
market price. This is equivalent to subsidizing these millers US$502,445 and flooding the markets in those areas with inexpensive GRZ maize (depressing farmgate prices and subsidizing consumption).

IV. AGRICULTURAL SUPPLY RESPONSES

In its presentation to Consultative Group Meeting in Paris (July 1997), the GRZ listed its primary goal for its enhanced SAP (1997-1998) as being the acceleration of the supply response of the Zambian economy, especially in the agricultural sector. It has however reneged on promises to divest itself from fertilizer and maize sector investments. Uncertainty amongst commercial fertilizer traders regarding GRZ intentions has been listed as the main reason farmers did not have the fertilizer to apply to maize crops during this past growing season. Although sporadic rainfall has adversely affected maize crops this year, the current maize shortage has been aggravated by chronically poor maize yields. One fertilizer supply agent predicted that this year's maize yield in the Choma region would be cut by one-third due to unclear GRZ policies and an uncertain private sector response.

Following independence in 1964, the GRZ continued to encourage maize production using parastatal and pan-territorial/pan-seasonal pricing policies. As can be seen, maize production has fluctuated greatly over time peaking in the mid-1970s and reaching a historic low during the 1992 drought.

Figure 4: Zambian Maize and Seed Production

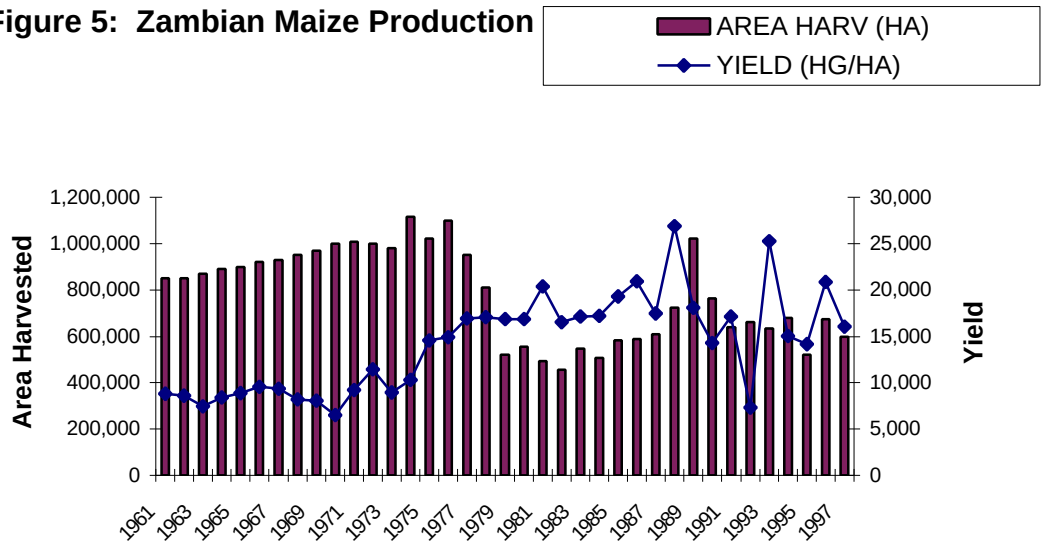


Source: FAO (1998).

Yield and area planted also have fluctuated over this time period (Figure 5). Much of the yield fluctuation is due to weather conditions. However, it should be noted that fragile soils and inconsistent fertilizer policy have decreased the productivity of Zambian soils. Often times modern seed varieties and

fertilizer regimes that were unsuited to Zambian farmers (little or no access to irrigation) have led to extremely poor maize yields. This can be seen in looking at the rapidly fluctuating yield and production figures in the mid-1990s.

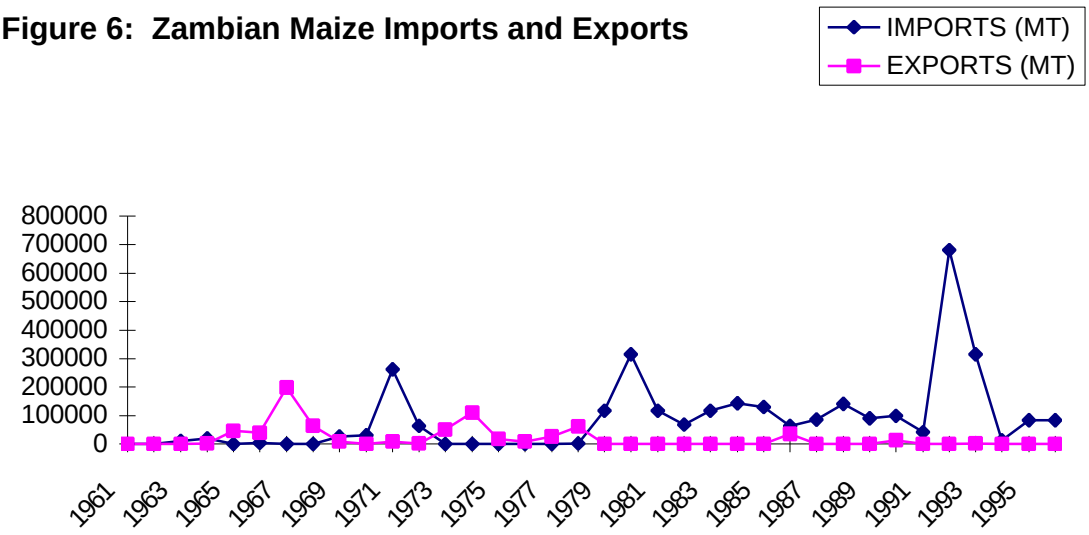
Figure 5: Zambian Maize Production



Source: FAO (1998)

Furthermore, it can be seen from Figure 6 that since 1978 Zambia has been a significant net importer of maize and that every 10 years or so there is a peak in imports (roughly reflecting drought conditions). As maize was the main staple for these years this reflects the increase in household food insecurity. Even though the export figures do not reflect informal cross-border maize traffic to such countries as the DRC, it can be noted that Zambia did commercially export significant quantities of maize at one time (relative to consumption). If the 1992-1993 peak is removed it would appear that in per capita terms that maize imports have declined since the beginning of economic reforms in the mid-1980's.

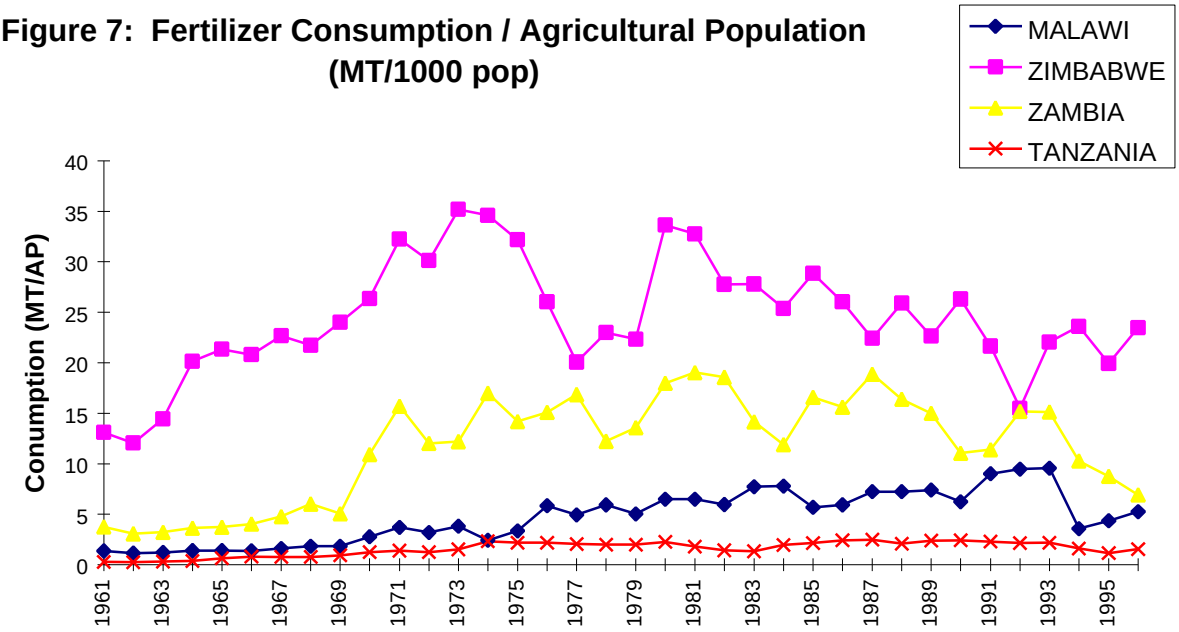
Figure 6: Zambian Maize Imports and Exports



Source: FAO (1998).

The profitability of fertilizer use for many Zambian small-scale maize farmers is questionable. It can be seen from Figure 7 that on average Zambian farmers use more fertilizer than their Malawi and Tanzanian neighbors, but less than farmers in Zimbabwe. Due to high transport costs, it is difficult for many remote farmers to source sufficient fertilizer at a reasonable price and on time for it to be profitable at recommended ratios. The viable number of small-scale farmers who are able to profitably utilize fertilizer at these ratios is estimated to be approximately 22% (Johansson 1998). There is a much larger number of smallholders that use fertilizer at sub-optimal ratios (estimated to be roughly 50%). The thriving fertilizer-marketing sector, which has developed since liberalization, can be observed at most public markets. 50 kg bags of fertilizer (primarily compound "D" and urea) are being traded for bags of maize (currently the trading ratio is 1x50 kg bag of fertilizer per 1x90 kg bag of maize). In addition, available are small 500 gm bags of fertilizer selling for K500. Often times these are used for domestic garden and dambo production.

Figure 7: Fertilizer Consumption / Agricultural Population (MT/1000 pop)



Source: FAO (1998).

Following GRZ liberalization in the agricultural input supply markets in 1995, the private sector began to cater more to farmer needs. This provision of important agronomic/extension services is important for the Zambian small-scale farmer. In a recent CLUSA workshop, one depot manager cited the problem with past GRZ fertilizer policy as being late provision of supplies and lack of credible extension information to guide the small-scale farmer in the use of the fertilizer. He said the often times the fertilizer would be sold to larger, commercial farmers.

Example 7: OMNIA Small Scale

As reported at a recent workshop Omnia is providing small-scale farmers with more appropriate mixes of fertilizer for maize production. They have invested in agronomic extension services and are now supplying two new fertilizer types: Compound MM and Limestone / NO_2. Together these cost less expensive than traditional Compound "D" and Urea, with the added benefit of including essential lime necessary to replenish soils leeched by many years of maize mono-cropping.

Other Food Staples

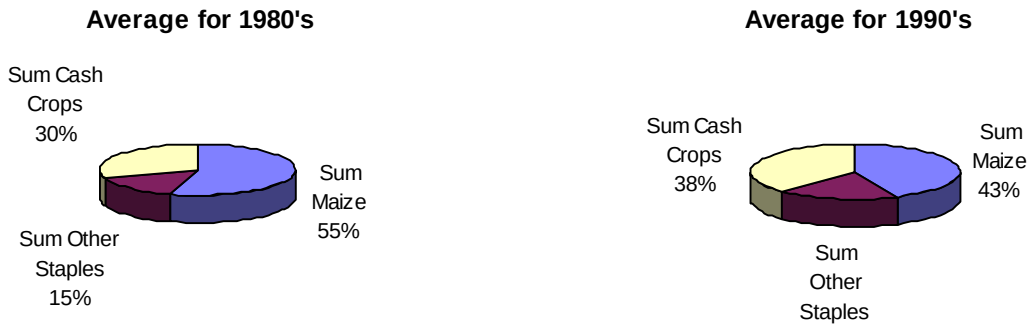
As the GRZ removed trade restrictions including export taxes, the agricultural export sector increased output dramatically**.** This response has been linked to possible decreases in food security, as there will be

movements of factors of production away from maize into non-staple, cash crops (such as paprika). Export earnings to farmers increase, although the availability of food crops to buffer adverse price (e.g., falling cotton prices) or climactic effects (e.g., El Niño) are reduced. Therefore, it is necessary to examine the effects of crop diversification both between cash and staple crops and between different staple crops.

Much of Zambia is a drought prone region. In the past 10 years there have been four years of low rainfall. In addition, when rains do arrive, often times they are sporadic both in location and quantity. As a consequence, in the more arid Southern and Western provinces such crops as millet and sorghum provide greater sustainable crop yields than maize; in the wetter Northern and Luapula provinces crops such as cassava and sweet potatoes provide greater sustainable crop yields. In 1998, it is estimated that there is 1,059,053 MT of sweet potato production and 1,847,814 MT of mature cassava for consumption (Wood, et al, 1998). This is equivalent to 60% of the country's food energy production. The reintroduction of other grains such as sorghum and millet to the Southern and Central Provinces has been a slower process. The lack of alternative staple crops in the Southern and Central Provinces is stated to be one of the main reasons for food insecurity in these areas (Wood, et al, 1998). These crops were traditionally grown as staples before the agricultural policy forced maize production[12] and they exploit soil fertility to a lesser degree than does maize. It can be seen (Figure 8) that maize planting has declined as a percentage of total agricultural HA planted (from 63% to 43% over the period examined). Cash crop production has been increasing as have other staples over the sample period. These changes are most notable over the most recent 10 years.

Figure 8: Crop Diversification

[12] A deputy minister for MAFF described Zambian agriculture policy as being a country-wide maize outgrower scheme.



Source: MOF (1998).

Data for this comparison were derived from the United Nations Food and Agriculture Organization, MAFF, MOF, and several other sources of documentation. The data available was often contradictory in nature, which required the cross-checking several documents for similar information in order to verify statistics. Often the production data was available, but the amount of hectares was not. To verify area harvested it was necessary to extrapolate using yield values for cotton and total production figures. It should be noted that certain cash crops were not included in the comparisons due to relatively small production and unavailability of time series data (e.g. paprika, coffee, tea, and mixed beans). The formation of efficient, market driven farmer groups to take advantage of increasing returns to scale in purchasing inputs and marketing outputs has been encouraged since liberalization by several donor and domestic agencies. ASIP emphasizes the need to form associations that help in the bargaining process. Bulimi Outgrowers Farmers Association (BOFA) is an example of one such farm group. The group initially started with 38 kg of groundnut seed in 1993 with members and has increased to 92 outgrowers who expect to harvest 15 MT of shelled groundnuts in 1997/98. These farm groups also provide a vehicle for efficient delivery of extension services and the introduction of new, soil husbandry techniques. New soil husbandry technologies[13] are necessary to decrease farmer dependence on inorganic fertilizers and to retain soil fertility. Even when applying recommended fertilizer ratios, maize yields fell from 5.9 MT/HA to 4.5 MT/HA over 6 years in Misamfu fertilizer trials (FAO/World Bank 1998).

Example 8: Rural Farm Groups.

[13] These techniques include: conservation farming, minimum tillage, n-fixing, carbon and phosphorous replenishment, reduction of acidity and aluminum toxicity.

CLUSA has been implementing a Rural Group Business Program (RGBP), which encourages cooperating farmers to diversify their cropping choices and to include low rainfall sustainable farming practices. The levels of sorghum production in CLUSA areas, for example, have been increasing since the project inception in 1996. In 1998, CLUSA signed a supply agreement with a multinational agroprocessor to supply 500 MT of sorghum at the price of $120/MT for use in feeds production. Low rainfall crops such as sorghum reduce risks for project farmers as they are drought resistant and in this case have attracted a minimum price. Prior to maize mono-cropping, sorghum was traditionally grown in the drought prone Southern Province. Therefore, it is expected that sorghum can be reintroduced as a local food staple. Through the introduction of conservation farming techniques, new crops, new varieties, and new equipment these rural farm groups have increased their collective incomes by $1.7 million (approximately 3000 farmers) since 1996[14]. In addition, the possibility of earning foreign exchange through large-scale marketing is an important inflation hedge for project farmers (CLUSA/Zambia 1998).

Some other interesting anecdotal statistics[15] related to NTE's:

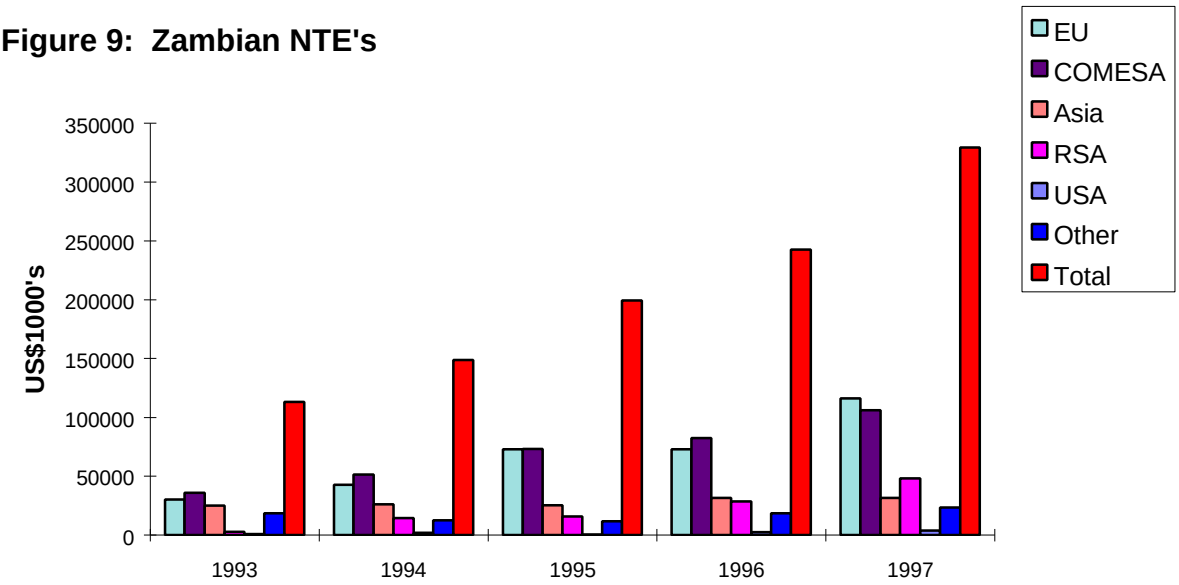
- Kawamba Tea Production increased from 10 MT to 100 MT in 1997/98 due to a $4million investment by the Binani Group, which plans to plant 500 HA of coffee and 250 HA of tobacco.
- Zambian coffee exports increased by 21.3% from 1,884 MT worth $5million in 1996/97 to 2,285 MT worth $6million in 1997/98.
- Zambia will export 50,000 MT of soybean meal to Tunisia and 95 MT of soybean oil to Denmark this year.
- A Chinese firm will import 25,000 MT of Zambian rice this year.

These potential contractual agreements reflect Zambia's increasing interaction with the global market outside of copper and maize. The majority of Zambian exports are destined for other African countries, although it can be seen that exports to the EU are also a significant percentage of total exports. Between 1993 and 1997 the percentage of imports to the EU and to Africa increased from 26% and 33% to 35% and 46% respectively. The main decreases in exports were to Asia, from 22% to 10%. Over this period NTE's experienced an average of 30% growth per year.

[14] A baseline comparison is not available, however several participants verify the increased profit available under the RGBD. Increased farm incomes during periods of drought is also a significant signal of project efficacy.

[15] As reported by local Zambian newspapers in July 1998 (Wentling 1998.3).

Figure 9: Zambian NTE's



Source: EBZ (1994-1998).

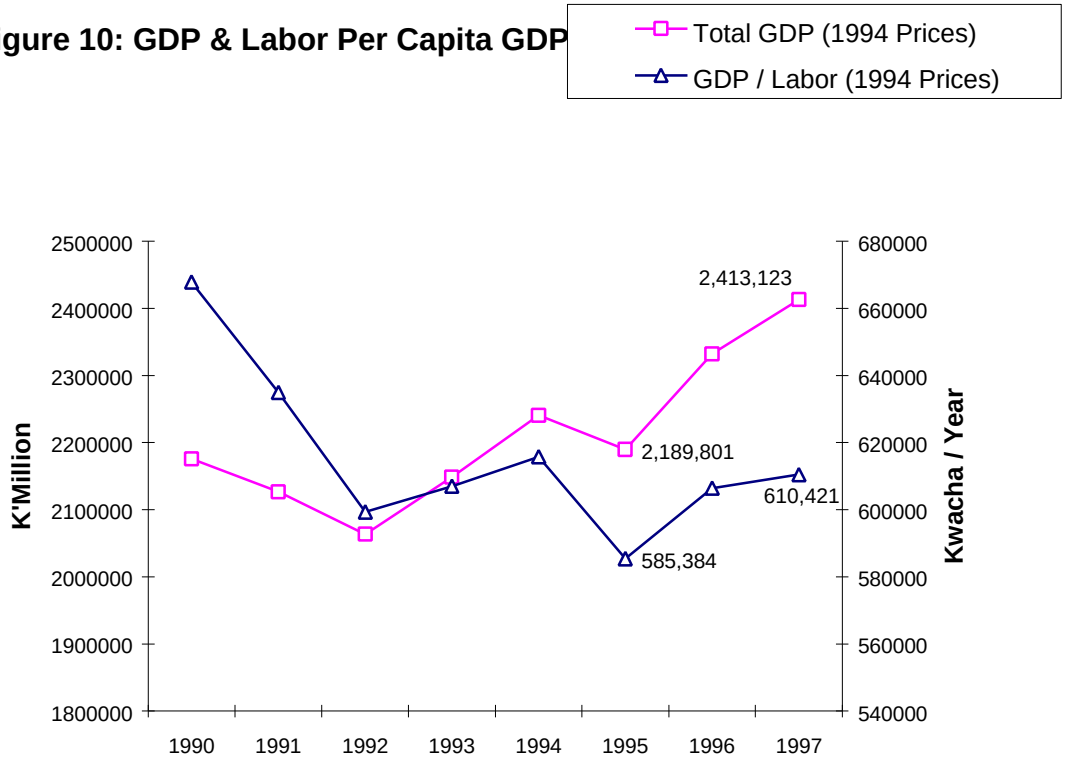
V. CONSUMER PURCHASING POWER

If we examine Zambian GDP (constant 1994 K'Million) and per capita income[16] it can be seen that although GDP has increased fairly steadily since the SAP's in 1990, labor per capita income (GDP / labor population) has fallen significantly since 1990. It can be noted that the trend lines for both GDP and labor per capita GDP have been increasing since liberalization of the agricultural sector in 1995.[17]

[16] This was calculated by dividing MOF statistics of GDP by World Bank statistics of the active labor force. Active labor force for 1996/97 were estimated using the annual labor growth as estimated by the World Bank.

[17] In 1995 agroprocessing parastatals were privatized, government ended involvement in domestic maize marketing, and cooperatives and credit insitutions were cut off from large state subsidies.

Figure 10: GDP & Labor Per Capita GDP



Source: World Bank (1995) and Ministry of Finance (1998)

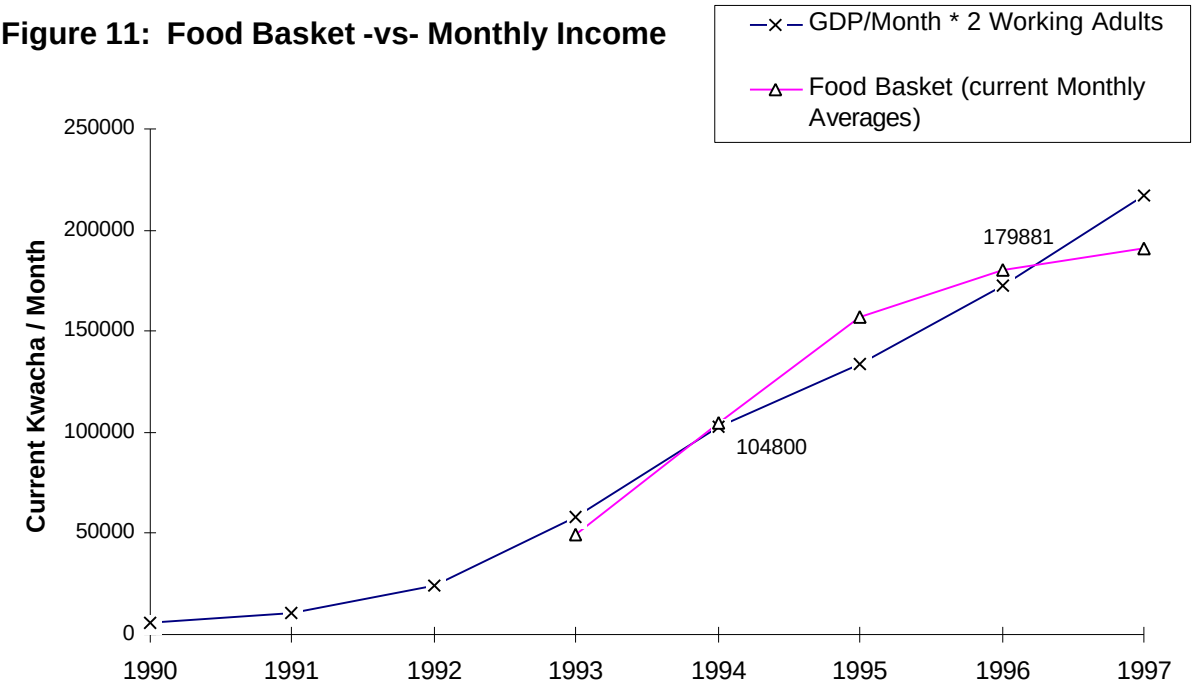
The effects of GRZ liberalization on consumer purchasing power can be analyzed using CPI, exchange rate, and year dummies. Unfortunately this analysis will be severely affected by particular aspects of GRZ economic reforms as they have been occurring intermittently over the past decade. For example, the macroeconomic environment in Zambia has deteriorated since early 1998. One main reason for this is the failure to privatize the Zambian Consolidated Copper Mines (ZCCM), the largest remaining parastatal. Since the fall in world copper prices, these mines have not been generating positive profits and have not been earning sufficient foreign exchange for the government to successfully pursue many of its stated SAP goals. The results have been very hard on the Zambian consumer (in 1998): high inflation, stagnant wages, and high rates of Kwacha depreciation have combined to erode their purchasing power. However, prior to recent economic instability, the SAP had generated desired results.

Example 9: Jesuit Food Basket Survey

Since April 1993, the Jesuit Centre for Theological Reflection has been calculating the cost to Zambian consumers of a basic food basket containing staple goods for a Zambian family of six for a one-month

period (mean family size in Zambia has fallen to 4.2 in Western Province and to 5.4 in Central Province; the mean now being approximately 5.0). It can be noted that the food basket does not contain: shelter, clothing, education, utilities, or medical expenses. For this comparison it is more appropriate to use GDP/Labor Population/Month than GDP/Capita/Month. If it is assumed that a typical Zambian family feeds approximately 6 people, on average since SAPs it can be seen that with two working adults the family will be able to afford only basic food necessities (see Figure 11). This does not include informal market transactions, which form the basis of many African economies. It also does not take into account income distribution factors, which is important for judging the impact on the larger number of impoverished households. Approximately 81% of Zambian small-scale, farm households are "extremely poor". This encompasses roughly 5 million people or 50% of the population (Living Conditions, 1996). Transition economies are often characterized by increasing income disparity, however the incidence of poverty has declined in rural areas. This crude comparison illustrates that in its transition to a market economy the typical Zambian family has not been adversely affected by the erosion of purchasing power[18].

Figure 11: Food Basket -vs- Monthly Income



[18] This comparison does not include 1998 values of Kwacha depreciation and high inflation. As has been noted earlier the over-valued Kwacha would have been devalued under any economic regime along with associated

Source: JCTR (1998) and MOF (1998).

The CSO reports (The Evolution of Poverty...1996, page 23) that overall poverty in Zambia increased from 11.5% in 1991 to 13.3% in 1993 and 16% in 1996. However, in the rural areas poverty at first increased from 87.9% in 1991 to 92.2% in 1993, but then decreased to 82.8% in 1996. Correspondingly, in the urban sectors the percentage of people below the poverty line decreased from 48.6% in 1991 to 44.9% in 1993, but increased to 46% in 1996. These trends may reflect the SAP effects of discontinuing ISI policies: eliminating urban food price subsidies and increasing the farmgate prices for agricultural produce. Corresponding to these statistics are population migrations between rural and urban areas. The CSO reports (Living Conditions, 1996) that there are increasing numbers of Zambian households returning to rural areas from the urban centers. In 1996, there were a reported 21,000 households who migrated from urban centers to rural areas and only 9000 households reported moving from the rural areas to an urban center. This supports the notion that a depreciated Kwacha and higher farmgate prices for produce will induce households to return to rural areas to farm.

The Zambian farmer gains from cash crops sales (in hard currency) and from crop diversification. The ability to earn hard currency helps to insure the farm family against detrimental depreciation of the Kwacha, in addition compared to maize many of these crops are better suited to the arid climate and soil fertility conditions of much of Zambia. Diversification of farm crops helps to diminish farmer exposure to adverse weather or environmental effects (weather, disease, pests, etc.). Diverse crop portfolios are also better suited to sustainable rotations of crops over arable land, unlike former maize mono-cropping, which severely leeched the soil of nutrients.

Example 10: Cotton Outgrowers

Many small-scale farmers are participating as outgrowers (an estimated 200,000). Lonrho Cotton has approximately 80,000 cotton outgrowers in Southern, Central and Northern Provinces. Under these arrangements the farmer is given fertilizer, credit and extension services in exchange for supplying Lonrho with their cotton output. Cotton is more drought resistant than is maize, although it is labor intensive. A typical cotton outgrower for Lonrho in 1998 farmed 2 HA of cotton and realized approximately $250 in profit[19]. Lonrho will pay for the cotton in hard currency at the spot price on the day of the transaction, which helps alleviate the risk of Kwacha depreciation, although it exposes farmers to the vagaries of

inflation rates. The rapid rate of this depreciation in 1998 can be attributed to the inability of the GRZ to divest itself of the ZCCM.

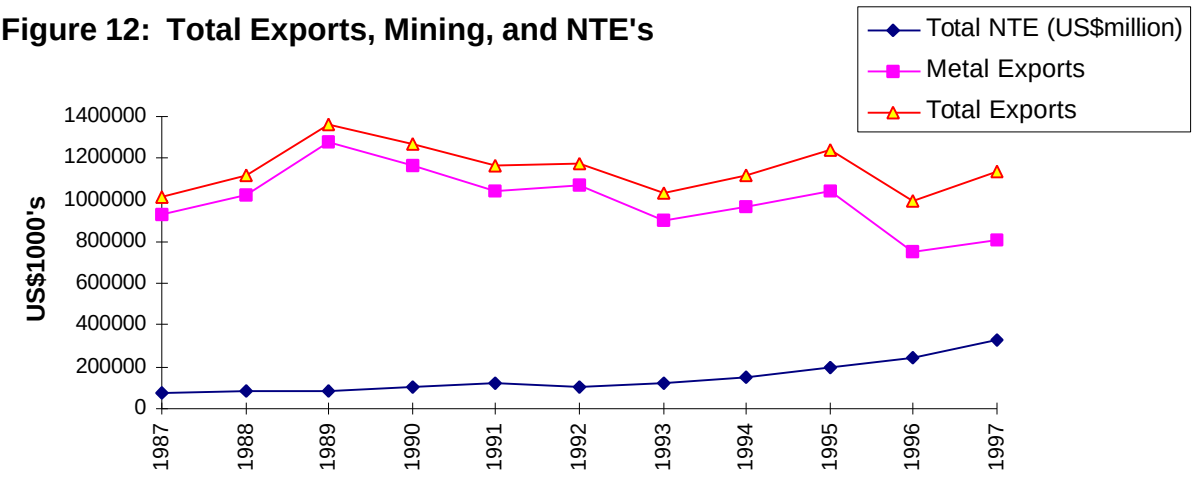
[19] Due to the lack of reliable savings institutions much of these earnings were reportedly spent on such consumer luxury goods, and did not benefit the majority of the farm household.

international cotton price fluctuations. This year cotton prices have been exceptionally depressed due to the Asian financial crises (the destination market for much of Zambian cotton). Despite this fact farmers are reportedly content with the outgrower arrangement; cotton production trebled from 40,000 MT in 1997 to 110,000 MT in 1998 (of which 64,000 MT went to Lonrho). Despite a drop in world cotton prices of 18% this year, the increase in cotton revenues to Lonrho alone will be from $55million to $75million. Of this it is reported that all but $10million in dividends will be channeled into Zambia (Wentling 1998.3). Farmers participating in the Lonrho outgrower arrangement will realize an aggregate profit of approximately $20million. Maize farmers in these areas are reporting a 33% decrease in maize yields this year due to El Niño; given: [a yield of 11x90 kg maize per HA (zero fertilizer estimate) and a farmgate price of K25000] x 33% = $7.3million. Participation in the Lonrho cotton outgrower scheme therefore has enhanced farmer profits in a weather adverse area by approximately $158.75 per farmer.

Nontraditional Exports

Copper has been the major Zambian export since independence. Maize was the major Zambian export crop up to 1978. After 1979, Zambia was a maize importer (see Figure 6). Due to falling copper prices and as a result of SAP's, Zambian non-traditional exports (NTE's) have become a larger share of GDP since liberalization. Typically, following depreciation of over-valued ISI currencies and lifting of restrictive export policies, LDC products become more attractive on the world market. It can be seen by examining EBZ documents that NTE's have increased as a percentage of Total Exports.

Figure 12: Total Exports, Mining, and NTE's



Source: EBZ (1994-1998).

Those farmers that have begun to diversify their cropping portfolio have been able to gain valuable foreign exchange during a period of Kwacha depreciation. In addition in many cases NTE's have been more lucrative than maize production.

Example 11: Farmgate Revenue Balance Sheet

Commodity	1997 (kg)	1998 (kg)	Change	Price Change / kg	Revenue Value
Maize	961,150	650,073	-311,077	$0.33	-$28.7 million
Cotton	40,000	110,000	70,000	$0.30	$21 million
Groundnuts	573,234	712,063	138,829	$0.42	$4.6 million
Wheat	58,000	70,000	12,000	$0.27	$3.2 million
Paprika	0	1,128	1,128	$1.125	$1.25 million
Tobacco	3,500	9,700	6,200	$0.889	$5.5 million
Total Increase					**$6.9 million**

The decrease in maize production is due to several factors. One is the movement of farmers away from maize mono-cropping. More importantly in 1997/98 was the erratic rainfall and uncertain fertilizer supply market, which depressed farm yields to a great extent. Given critical assumptions of normal rainfall and of GRZ non-interference in the fertilizer market the increase in farm earnings coming from cash crops would be roughly five times greater than it was. This increase in farmgate earnings is particularly relevant for issues of food security. As mentioned earlier, a critical component of food security is not only access to food, but the ability to purchase food.

VI. ASSESSMENT

One way of assessing the effect on food security (household or national) of global economies and other important policy variables is to econometrically define the relationship between them. Let FS be some measurement of food security that is a function of explanatory variables, vector (**X**).

Define	Variable	Expected Effect on FS	
		Short-Run	Long-Run
X1	Years since liberalization	?	+
X2	Maize as % of HA planted	?	-

X3	Drought resistant varieties as % of HA planted	+	+
X4	Cash crops as % of HA planted	?	+
X5	% NTE's in GDP	+	+
X6	Agribusiness output	+	+
X7	Population growth rate	-	-
X8	AIDS infection rate	-	-
X9	Measure of income inequality	?	-
X10	CPI	-	-
X11	Rate of depreciation	-	+
X12	Average wage level	+	+
X13	Governmental debt levels	-	-
X14	Government spending on public goods	+	+
X15	Government commitment to SAP	+	+
X16	Rate of urban unemployment	-	-
X17	Measurement of climatic conditions	+	+

Variable Effects:

(**X1**) Years since Liberalization. It will take some time to reverse the effects of the inherited economic problems from the previous thirty years. Therefore, there may be a transition lag for this variable. Many of the harsh economic conditions today are direct results of the unsustainable ISI policies of the 1970's and 1980's.

(**X2**) Maize as a % of HA planted. If world prices for maize are high and Zambia has a good year climatically then food security will be positively affected by the amount of HA planted in maize. In the long-run as Zambian farmers diversify their cropping decisions (i.e., decreasing the amount of maize planted as a % of total HA) food security will be enhanced.

(**X3**) The quantity of drought resistant staple crops planted (e.g. sorghum, millet, sweet potatoes, and cassava) will enhance Zambian food security as these crops will reduce exposure to climatic risk and will provide higher yields than maize in many of Zambia's regions.

(**X4**) The percentage of cash crops planted will positively affect farm earnings in the long run, once farmers become habituated to the input requirements and once they have reliable access to commodity

information. In the short run, cash crops will increase farm earnings (and thus food security) unless the price of the crop falls on the world market making it difficult for the farmer to market his/her crop at a profitable price.

(**X2**), (**X3**), and (**X4**) Can also be grouped according to the effect of diversification of cropping portfolios, which is beneficial for decreasing exposure to world price fluctuations, to changing environmental conditions, and to diminishing soil fertility rates.

(**X5**) Increasing percentage of NTE's in GDP. This variable reflects the diversification of the economy, which is necessary to insure sufficient inflows of foreign exchange. In the long run this variable will reflect the positive effects of decreasing dependence of the GRZ on copper earnings.

(**X6**) Agribusiness Output. Similarly, this variable reflects a diversification of the economy and also reflects the health of the agricultural sector. As agribusiness output increases the selection of domestic food goods available to the consumer will increase in addition to increasing employment opportunities and markets for domestically produced agricultural produce. All of these positively affect food security.

(**X7**) Population growth rate: High rates of population growth will diminish food security for Zambia.

(**X8**) AIDS Infection rate. The devastating impact on the economy in loss of human capital due to high AIDS mortality has not yet been empirically calculated. In addition, the diversion of scarce GRZ funding to deal with this crisis will also negatively affect Zambian food security (at both the household and national level).

(**X9**) Measure of Income Inequality. The effect of this variable in the short run is somewhat ambiguous. Many people argue that with economic growth also comes increases in income inequality. In the long run the effects of increasing inequality over time will detrimentally affect food security.

(**X10**) CPI. This charts the changes in the cost-of-living for Zambians and therefore increases in the CPI indicate that it costs more to buy things and therefore negatively affects food security.

(**X11**) Rates of Depreciation. In the short run a depreciating Kwacha diminishes the ability of those on fixed incomes to purchase necessary food stuffs. In the long run a depreciating Kwacha makes Zambian products more attractive on the world market, encouraging export-led growth.

Example 12: Safari Tourism Industry

Privatization of the tourism industry in particular that of safari tourism has been a slow process since the SAP went into place in 1990. However, in the past year, there has been a large increase in the number and variety of safari tour companies operating in such national parks as Lower Zambezi. In an interview with one operator, the depreciation of the Kwacha was noted as one of the reasons for increased foreign

investment into the Zambian tourism industry. In addition, there are currently far fewer visitors to the Zambian parks as compared to surrounding countries (primarily due to infrastructure problems), which is seen to be a positive selling point for Zambia. He noted that the increase in tourism in Zambia will lead to decreased poaching opportunities, which will in turn positively affect the quality of the parks (poaching in many parks has severely depleted the value of those parks to photo-tourists). All in all, he views the safari tourism industry in Zambia as a very good investment at this time for long-run profitability.

(**X12**) Average Wage Levels. Comparing average wage levels is useful to assess the detrimental effects of increases in the CPI and a depreciating Kwacha over time on food security. In general higher wages translate to increased purchasing power and therefore, enhanced food security.

(**X13**) GRZ Debt. Decreasing the amount of debt owned by the GRZ will lead to increases in national food security as funds will be freed for investments in infrastructure and human capital. A key area for food security enhancement is the development of a reliable road network so that farmers can market their goods and so that goods can reach the farmers.

(**X14**) GRZ Public Good Investment. As mentioned above GRZ spending on public goods (roads, education, health facilities, communications, etc.) will enhance food security.

(**X15**) GRZ Commitment to SAP. The government's commitment to SAP can be inversely measured as the amount of scarce foreign exchange it spends on maize and fertilizer imports. These two crucial goods remain political tools of the GRZ. Its direct and indirect involvement in these sectors retards the development of an efficient private sector, which has the capability of supplying these goods. The net effect is to retard farm gate prices, increase input costs, and decrease food security.

(**X16**) Urban Unemployment. The high rates of urban migration due to deficit ISI spending should slow with SAPs. However, the current high urbanization of Zambia's population directly hinders its ability to meet food security goals. The rate of urbanization should increase in the future with the development of the service and manufacturing sectors, but in the short run the underdeveloped rural agricultural sector will show the greatest potential for economic growth. The CSO reports (Living Conditions...1996, page 33) that there are increasing numbers of Zambian households returning to rural areas from the urban centers. In 1996, there were a reported 21,000 households who migrated from urban centers to rural areas and only 9000 households reported moving from the rural areas to an urban center. This supports the notion that a depreciated Kwacha and higher farmgate prices for produce will induce households to return to rural areas to farm.

(**X17**) Measurement of Environmental Conditions. The detrimental effects of drought and unfavorable growing conditions have always adversely affected food security.

VII. CONCLUSIONS

The stated goals of the 1991 SAP was to achieve macro-economic stability, reduce poverty, and to achieve high rates of export-led economic growth. This study has used a variety of anecdotal and simple comparative statistics to evaluate whether SAPs were leading to these goals and to increased household food security. In this analysis two distinct time periods have been evaluated: 1990-1997 and 1998. The reason for this is that 1998 represents a marked departure from SAPs, especially with respect to agricultural sector liberalization.

1990-1997

Since liberalization, there have been significant movements towards alternative staple crops, towards alternative cash crops, and towards sustainable small-scale farm institutions. The development of a market driven economy and subsequent price signals, which are used by farmers to decide on cropping choices, have been essential for these movements. They translate into lowered risk of crop failure through diversification, and increased food security due to cash crop revenues and higher yielding staple crop varieties. The increased competition in the private sector maize marketing and input supply sectors are beneficial to the majority of small-scale farmers, reducing input costs and increasing farmgate prices. The development of reliable private sector services in more remote areas has been retarded by poor infrastructure. Consequently market signals have induced that population to diversify into more appropriate staple crops and land husbandry practices. During this period food staple marketing margins decreased, and farmgate prices increased. The value of NTE's increased at a rate of 30% per year. In 1997, the increase in farmgate revenues from 1997 to 1998 due to cash crops equaled $35.55 million. A large amount of this increase went directly to Zambian smallholders (there are approximately 200,000 small-scale outgrowers). The decrease in maize production due to adverse weather and input supply markets was more than offset by production of alternative staple crops (sweet potato and cassava). There is an estimated 1997/98 food surplus of 350,000 MT when alternative staples and cash crops are included in food balance sheets. This contradicts WFP/FAO and MAFF food balance sheets showing a 630,000 MT cereal import requirement. There was a reversal of urban household migration and a decrease in the number of extremely poor rural households since 1991. Labor per capita GDP had been increasing since 1995, keeping pace with inflation.

1998

The outlook for 1998/99 is for (partial) reversals of 5 years of progress. The uncertain investment environment caused by recent GRZ policies will hinder the development of a competitive private sector. Similarly, donor institutions will be reluctant to advance assistance to the GRZ as it wavers in its commitment to SAP's. High rates of depreciation and stagnant wage levels will significantly erode consumer purchasing power, particularly in urban centers. This will force more Zambians into a poverty trap in which they have to spend so much of their time, energy, and income just to get by that they are much more subject to external health and economic risks (e.g. malaria, increasing education costs, partial drought, etc.). Failure to sell the ZCCM has led to unstable currency markets: rapidly depreciating Kwacha, extremely high interest rates for commercial loans, and very tight supply of foreign exchange. Resulting inflation and stagnant wage levels has significantly eroded urban consumption power in recent months. Uncertain GRZ policy with respect to fertilizer and maize markets has caused the private sector to reevaluate investments in increased capacity. The GRZ has tendered enough fertilizer to supply all maize farmers during the 1998/99 growing season (the GRZ fertilizer will most likely be sold at a loss to subsidize smallholder demand). This fertilizer will arrive late (if at all) and will severely restrict smallholder demand for privately supplied fertilizer (although there has been significant fertilizer distribution commercially to smallholders using maize-fertilizer exchange programs). This will in turn cause smallholder yields to be extremely low and will retard the development of a competitive private fertilizer sector, necessary for the agricultural productivity gains. The GRZ tender for 410,000 MT of maize for food security reasons is also counterproductive. The private sector has already demonstrated the ability to import and lower cost significant quantities of maize. The GRZ maize will most likely be sold at a loss to subsidize urban consumption. This deficit spending is similar to past unsustainable ISI policies that led to the massive economic crisis in the mid-1980's. Scarce foreign exchange holdings are not being used for rural infrastructure development. The poor interior road conditions and lack of transparency in GRZ policies are cited as the largest obstacle to the increased private sector investment in Zambia.

Future Research

Four main limitations to the effectiveness of the SAP have been identified[20]:

(1) inherited structural deficiencies,

(2) drought conditions since 1991,

(3) affect of high AIDS rates on human productivity,

20Cited by political economist, Peter J. Henriot S.J., during August 6, 1998 interview in Lusaka.

(4) inefficient implementation of liberalization,

(5) inability to privatize ZCCM, and

(6) inability of GRZ to fully commit to its stated SAP goals.

How can one assess the effects of liberalization on food security when these limitations may be the most import variables in such an analysis? For Zambia it would seem that a comprehensive analysis of the economic effects (by sector and region) of increasing AIDS mortality rates would be extremely relevant.

Example 13: HIV Infection Rate

Zambia has one of the highest rates of HIV infection in the world. It is estimated that approximately 30% of the entire population is HIV+. Those infected generally fall between the ages of 12 - 40, or within the effective labor population. As a result, by 1995 life expectancy had fallen to 45.57 years (the life expectancy peaked in Zambia in 1982 reaching 51.37 years). Recently, researchers at the University of Alabama research facility in Zambia estimated that the mean life span after testing HIV+ was approximately 10 years (conservative estimate). The effective labor force in Zambia is approximately 3.74 million. Given that at least 30% of these people have contracted HIV, it is safe to assume that over the space of 10 years a minimum of 1.12 million people will die from AIDS. That is roughly 100,000 working adults per year. The detrimental effects on labor productivity are difficult to model, but the loss of 3% of the working population per year is immense. This is a minimum figure and may be much larger than this. A more realistic estimate is that 40% of the working population is infected; that life expectancy is 8 years following infection; and that human capital degrades to at least 50% after 5 years (due to associated illness). This equals a loss of 5% in human capital due to death (187,000 people per year) and a loss of an additional 5% loss due to associated AIDS illness. This estimation of a 10% loss in human capital per year due solely to AIDS is not overstated. There is not only the loss in human capital, but also the disruption in society's social fabric and the diversion of scarce public good resources that will slow growth. To overcome this, it will be necessary for all economic sectors to realize extraordinary growth rates in factor productivity.

Another important consideration, which is hard to quantify is "uncertainty". By nature, transition economies are going to experience change. Governments and private investors are slow to act during times of change. This often results in inconsistent government policies and hesitancy on the part of the private sector. There are many examples of this in the Zambian economy, which detract from the SAP

goals. The fertilizer supply market is one that the private sector has begun to invest in, but is somewhat hesitant when the GRZ tenders for large quantities of fertilizer. The GRZ says that it must import fertilizer because the private sector does not service small farmers in some rural areas. The uncertainty surrounding the privatization of the Nkana and Nchanga mine divisions has also led to macroeconomic problems that have infected the entire economy. Because production at the ZCCM is constrained by lack of new investments in technical support and due to low international copper prices (a fall in international copper prices from $0.95/lb in January 1998 to $0.73/lb in August 1998), the GRZ is suffering from a scarcity of foreign exchange. This in turn has led to a large Kwacha depreciation in 1998, reducing the purchasing power of the consumer and retarding domestic demand.

There are many aspects of this analysis that suffer from insufficient time and data. In addition a more comprehensive economic model would be useful in simulating the effects of the aforementioned policy variables on Zambian food security. Such an analysis might include a computable general equilibrium (CGE) approach similar to that used by Bautista, Robinson, Tarp, and Wobst (1998) or a dynamic CGE similar to that used by Daio and Roe (1998). These approaches rely on the availability of reliable macroeconomic time series data, which is somewhat sparse in Zambia (although the MOF has become more sophisticated in the past several years). This model in its most basic form could determine the effect of GRZ fertilizer and maize imports, the effect of changing population demographics and growth rates, and the effects of cash crop diversification on food security to a greater extent than the descriptive statistics used in this study.

In addition, the more microeconomic analysis of farm level decision-making is an area rich in research potential. These include fertilizer choices, cropping decisions, husbandry techniques, enrollment in outgrower schemes, distribution of household income, etc. There are several untapped sources of data that may offer interesting insights into these issues, which all effect household food security. A game theoretic approach could be used to evaluate the payoffs from enrolling in these programs and the payoffs from alternate fertilizer and soil husbandry techniques. The new game theory approach to political economies could also shed light on the seemingly ambiguous decisions of the government to tamper in the maize marketing and input supply sectors. The resulting investment (divestment) decisions made by private sector companies, commercial farmers, and smallholders could be evaluated using this approach as well.

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APPENDIX A: Interviews

July 17, 1998:	Neville Crosse & Dr. M Jangulo Omnia Fertilizer Zambia Limited	Lusaka, Zambia
July 20, 1998:	Ginty Melvill Operations Director of Lonrho	Lusaka, Zambia
July 20, 1998	S.G. Mtamira & Gary Nkombo SGS/Lusaka	Lusaka, Zambia
July 22, 1998:	Iqbal Y. Alloo Managing Director of Sable Transport	Lusaka, Zambia
August 5, 1998:	Patrick Mumba Exatrade	Lusaka, Zambia
August 6, 1998:	Peter J, Henriot, S.J. Jesuit Centre for Theological Reflection	Lusaka, Zambia
August 6, 1998:	Ron Miller CLUSA	Lusaka, Zambia
August 11, 1998:	Small-scale Maize Trader	Choma, Zambia
August 11, 1998:	Prakash T. Naix Choma Maize Marketing	Choma, Zambia
August 12, 1998:	Small-scale Maize Vendor	Monze, Zambia
September 9, 1998	Hammermiller	Lusaka, Zambia
September 11, 1998	Hammermiller	Lusaka, Zambia

APPENDIX B: Time Line of Structural Adjustments

Date	**Policy**	**Exchange Rate**	**Fiscal Policy**	**Other**
1964 - 1967	Mixed Economy	Fixed	Expansionary	ISI
1968 - 1974	Control Economy	Fixed		Nationalizations
1975 - 1979	Regime of Controls	Occasional Devaluation	Deficit Financing and Foreign	Import Quotas and Restrictions On Borrowing

1980 - 1982	First Attempt at Adjustment		Further Devaluation	Expenditure Reduction	High Tariffs
1983 - 1987	Stabilization and Adjustment		1985 Auction System	Wage Restraints and Credit Squeeze	Interest Rates decontrolled
1987 - 1989	New Economic Recovery Prog.		Fixed Exchange rate and Forex Rationing	Price Controls Reintroduced	Interest Rates controls Re-introduced
1990 - 1995	SAP	‘90	OGL Private trading, except maize		
		‘91	Official Windows Unified	Curb Money Supply and Increase Resource Mobilization	
		‘92	Exchange Rate at Market Clearing levels	T-bill Auction Elimination of Mealie Subsidies	Interest Rates liberalized; Privatization Act
		’95	Liberalization of Maize and Fertilizer Sectors		